HD

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/042,624	01/09/2002	Stefano Gliozzi	GB920010034US1	4377

30400 7590 10/31/2007

HESLIN ROTHENBERG FARLEY & MESITI P.C.
5 COLUMBIA CIRCLE
ALBANY, NY 12203

EXAMINER	
JARRETT, SCOTT L	

ART UNIT	PAPER NUMBER
3623	

MAIL DATE	DELIVERY MODE
10/31/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/042,624	GLIOZZI ET AL.	
	Examiner	Art Unit	
	Scott L. Jarrett	3623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 September 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17 and 19-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17 and 19-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This **Final** Office Action is in response to Applicant's amendment filed September 7, 2007. Applicant's amendment amended claims 1-17 and 19-20, canceled claim 18 and added new claim 21. Currently Claims 1-17 and 19-21 are pending.

Response to Amendment

2. The Objection to the title in the previous office action is withdrawn in response to Applicant's amendment to the Title.

The 35 U.S.C. 112 (2) rejection of Claims 8-12 and 17-18 in the previous office action is withdrawn in response to the Applicant's amendments and arguments.

The 35 U.S.C. 101 rejection of claims 1-18 and 20 in the previous office action is withdrawn in response to Applicant's amendments to claims 1-17, 20 and cancellation of claim 18.

Response to Arguments

3. Applicant's arguments with respect to claims 1-17 and 19-21 have been considered but are moot in view of the new ground(s) of rejection.

In Applicant's remarks filed September 7, 2007 Applicant's argue that the prior art of record fails to teach or suggest all the claim limitations of newly amended claims 1-17 and 19-20, specifically that the prior art of record fails to teach or suggest optimizing a yield parameter resulting from assigning a capacity offered by a future

instance of a cargo flight wherein the capacity is defined by a plurality of capacity variables (Last Paragraph, Page 14; Paragraphs 2, 4, Page 15) or that the capacity variables include weight and volume and the yield parameter consists of revenue (Paragraph 3, Page 15).

In response to Applicant's arguments that the prior art of record fails to teach or suggest optimizing a yield parameter resulting from assigning a capacity offered by a future instance of a cargo flight wherein the capacity is defined by a plurality of capacity variables the examiner respectfully disagrees.

Zeni clearly teaches the old, widely practice and well known use of revenue (yield) management systems and methods whose purpose, by definition, is to optimize a yield parameter, namely revenue, by optimizing the assignment of capacity requests (i.e. to determine which requests to accept or reject) in order to maximize revenues and/or profits. More specifically Zeni teaches a yield/revenue management of air cargo flight optimizing a yield parameter resulting from assigning a capacity (in Zeni's case passengers) offered by a future instance of a cargo flight wherein the capacity is defined by a plurality of capacity variables (number of seats, aircraft capacity, fare classes, etc. Paragraph 2, age 4; Paragraphs 1-2, Page 14; Section 1.6, Pages 15-16; Table 1.2; Paragraph 1, Page 73; Tables 1.1, 1.4, 3.6, 3.7).

In response to the Applicant's arguments that the prior art of record fails to teach of suggest that the capacity variables include weight and volume and the yield parameter consists of revenue the examiner respectfully disagrees.

Zeni teaches a *revenue* management system, which by definition optimizes at least one yield parameter wherein the yield parameter, is revenue.

Most cargo, air or other means of transportation methods, take into account a plurality of capacity variables include weight and volume as evidenced by at least the following references.

Benda et al., U.S. Patent No. 6,937,992, teach a yield management system and method for allocating capacity (freight transportation capacity, volume, weight category, cubic capacity, length, cartons, containers, etc.).

Ott, Swissair Tests Cargo Management System to Stem Declining Yield (1988), teaches the well-known utilization of air cargo revenue management systems and methods wherein the system/method determine an authorization to allocate offered capacity of each capacity variable based on historical customer request data (profiles) including the weight and space occupied by the cargo.

Bazaraa, Airline Capacity Forecasts Help Shippers Plan More Accurately (1992), teaches American Airlines utilization of an air cargo revenue management system and method comprising storing historical profiles/data (airway bills) for a plurality of past service instances (cargo shipments), a plurality of different capacity categories (buckets, product types), capacity forecasting (demand and supply, weight, volume, distance, equipment type, lift capacity, etc.) and booking control (accept/reject, authorize

shipment requests for various buckets/product types) in order to maximize total revenue.

Adyanthaya, Revenue Management: the Black Art (1998), teaches the well known utilization of advanced mathematical and statistical techniques applied to airline revenue management including air cargo capacity that accounts for the volume, weight and density of transported objects as well as stacking and other logistical considerations.

It is noted that the applicant did not challenge the officially cited facts in the previous office action(s) therefore those statements as presented are herein after prior art. Specifically it has been established that it was old and well known in the art at the time of the invention:

- to approximate/estimate unknown intermediate values between two or more known values using a gradient, percentage, line and/or curve;
- to define nesting orders/hierarchies in airline yield/revenue management systems; and
- to update (revise) nesting orders (virtual nesting) wherein capacity categories capacity with positive demand should be ranked over capacity categories having negative demand.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-17 and 19-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding Claims 1, 17 and 19-20, Claims 1, 17 and 19-20 recites the limitation " allocate **the** offered capacity " in Claim 1. There is insufficient antecedent basis for this limitation in the claim.

Examiner interpreted the claim to read allocate **an** offered capacity for the purposes of examination. Appropriate correction required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-17 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeni, Richard H., Improved Forecast Accuracy in Revenue Management By Unconstraining Demand Estimates from Censored Data (October 2001) in view of Lee, Anthony Owen, Airline Reservations Forecasting: Probabilistic and Statistical Models of the Booking Process (1990) and further in view of Günther, Dirk, Airline Yield Management (1998).

It is noted that while the Zeni reference, as a whole, postdates the effective filing date of the instant application, the Zeni reference is being relied upon to show the level of ordinary skill in the art at or around the time the invention was made. See Ex parte Erlich, 22 USPQ 1463 (Bd. Pat. App. & Inter. 1992), MPEP 2124.

Regarding Claims 1, 17 and 19-20 Zeni teaches an air yield management systems and methods commonly comprise:

- defining capacity by a plurality of capacity variable (seats, volume, space, fare classes, etc.; Paragraph 2, age 4; Paragraphs 1-2, Page 14; Section 1.6, Pages 15-16; Table 1.2; Paragraph 1, Page 73; Tables 1.1, 1.4, 3.6, 3.7);

- storing a set of historical service profiles (data, information, booking profiles, booking matrix/table) including a value of each capacity variable reserved by each category (fares, fare class, products, product types, buckets, etc.; Booking Profile Method; Paragraph 3, Page 35; Paragraphs 2-4, Page 36; Page 37; Paragraph 1, Page 38; Chapter 2.8.8 Multiplicative Booking Profile Method, Pages 73-77; Tables 2.12, 2.13; Figure 2.7);

- assigning a probability to each previous instance of the service (Expectation-Maximization Algorithm, EM; Page 78; Chapter 2.8.10, Pages 80-83);

- estimating a potential profile/value (future, forecasted demand/supply) of the capacity variable from each historical profile/information according to a current value of the capacity variable reserved for future service instance and corresponding to an unconstrained demand of the capacity variable in the previous instance of the service (Paragraph 3, Page 35; Paragraphs 2-4, Page 36; Page 37; Paragraph 1, Page 38; Chapter 2.8.8 Multiplicative Booking Profile Method, Pages 73-77; Tables 2.12, 2.13; Figure 2.7);

- defining a historical scenario (series of historical profiles) for each previous instance of service including a final potential capacity variable from each potential profile (Booking Profile Method; Paragraph 3, Page 35; Paragraphs 2-4, Page 36; Page 37; Paragraph 1, Page 38; Chapter 2.8.8 Multiplicative Booking Profile Method, Pages 73-77; Tables 2.12, 2.13; Figure 2.7); and

- determining an authorization (approval, allocation, accept/reject reservations/shipments) to allocate the capacity for each capacity variable of each

category of the service by applying a stochastic model to the historical scenarios according to the corresponding probabilities (Paragraph 2, Page 4; Paragraphs 2-3, Page 14; Paragraph 3, Page 35; Paragraphs 2-4, Page 36; Page 37; Paragraph 1, Page 38; Chapter 2.8.8 Multiplicative Booking Profile Method, Pages 73-77; Tables 2.12, 2.13; Figure 2.7).

- determining/providing an acceptance or rejection of a request for the flight based on the authorization (opening/closing demand/fare classes, the purpose of booking limits is to accept/deny requests for capacity based on a plurality of factors; Paragraph 3, Page 35; Paragraphs 2-4, Page 36; Page 37; Paragraph 1, Page 38; Chapter 2.8.8 Multiplicative Booking Profile Method, Pages 73-77; Tables 2.12, 2.13; Figure 2.7).

Generally Zeni teaches the implementation details of a plurality of well-known and commonly used methods (approaches, techniques) for unconstraining constrained/censored data and forecasting demand as part of airline revenue (yield) management systems (Paragraph 2, Page ii; Paragraphs 1-3, Page 2; Paragraphs 1, 3-4, Page 3; Paragraph 2, Page 7; Chapter 1.3, Pages 8-9; Paragraph 1, Page 49; Paragraph 1, Page 247).

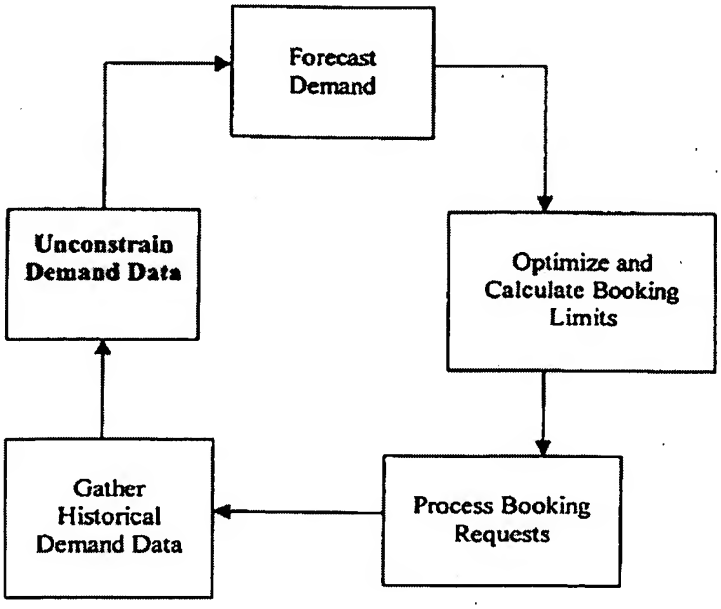

Figure 1.1: Revenue Management Process

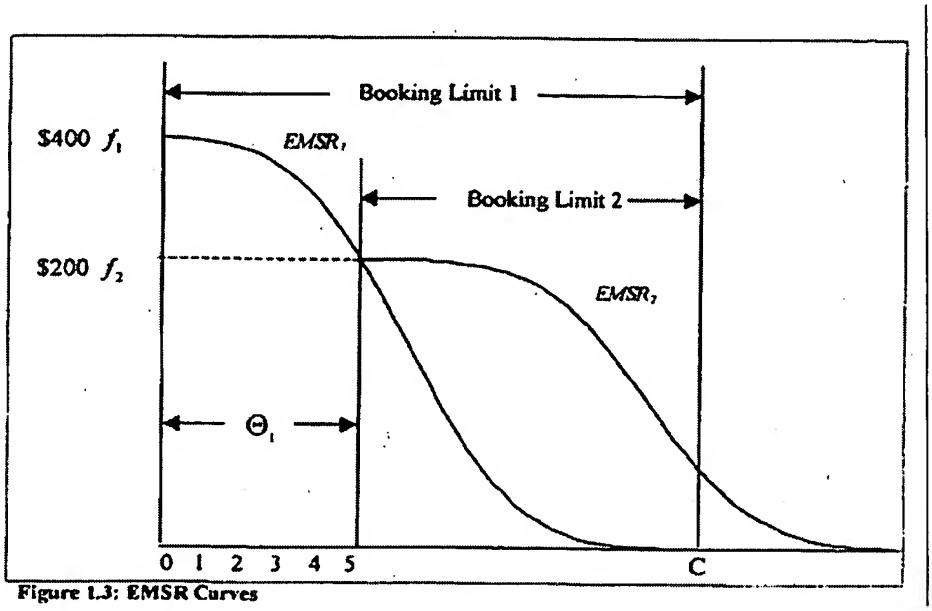

Figure 1.3: EMSR Curves

Week	DP 0	DP 7	DP 14	DP 21	DP 60	DP 90	DP 360
-4	100	90	70	55	25	10	0
-3	97	85	65	50	23	9	0
-2	94	80	60	45	21	8	0
-1	91	77	57	42	19	7	0
0	88	73	54	39	17	6	0
1	--	70	50	35	15	5	0
2	--	--	45	30	13	4	0
3	--	--	--	25	11	3	0

Table 2.1: Bookings Matrix

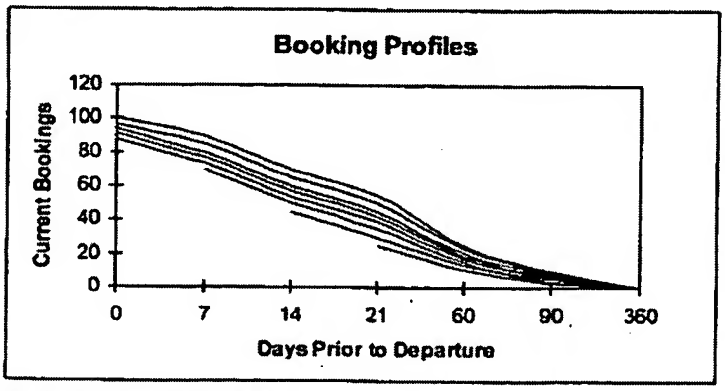

Figure 2.1: Booking Profiles

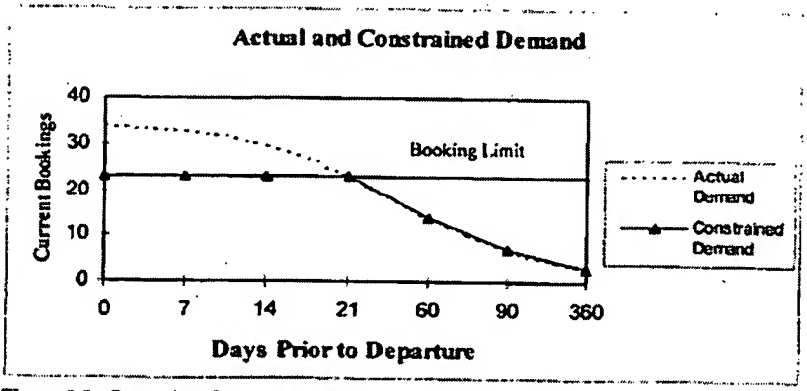

Figure 2.2: Censoring Caused by the Booking Limit

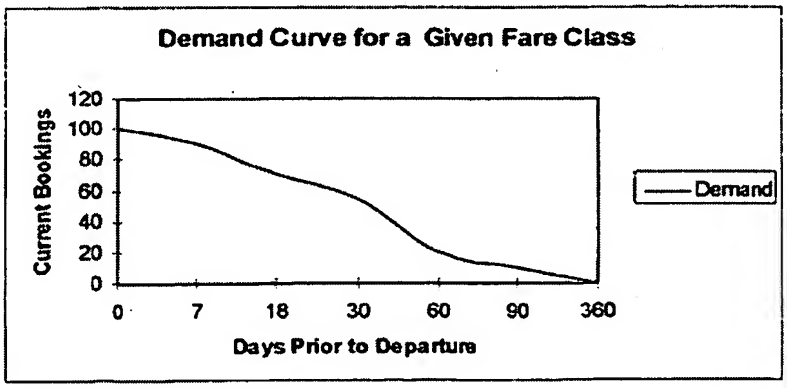

Figure 2.3: Demand Curve

	DP 0	DP 7	DP 18	DP 30	DP 60	DP 90	DP 360
Low Demand	50	47	35	30	17	10	0
Increase	6%	34%	16%	76%	70%	--	--
High Demand	100	94	70	60	34	20	0

Table 2.12: Low and High Demand Histories

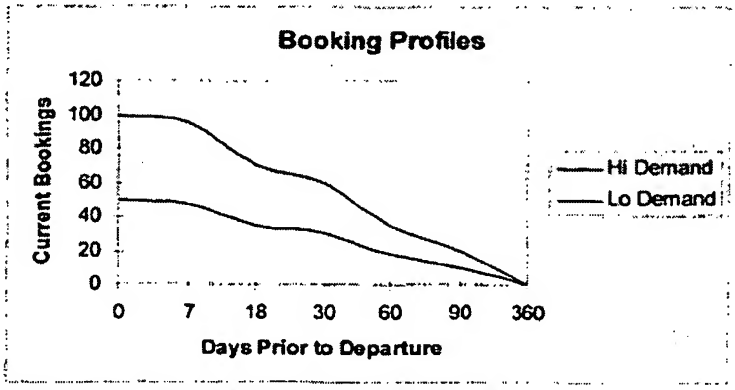

Figure 2.7: Low and High Demand Booking Profiles

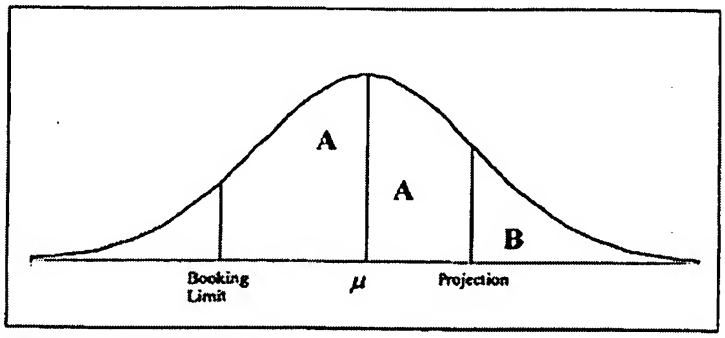

Figure 2.9: Projection Method

Zeni teaches a plurality of known and commonly used methods for unconstraining the inherently censored data of air revenue management systems/methods (Paragraph 5, Page 31; Chapter 2.5, Pages 48-49) including but not limited to Booking Profiles (Chapter 2.8.8, Pages 73-75), Expectation-Maximization Algorithm (Chapter 2.8.9, Pages 78-79) and Projection-Truncation Method (Chapter 2.8.14, Pages 91-95) wherein the unconstrained/uncensored capacity demand data forms the basis for more accurate forecasts (unbiased) of capacity demand utilizing a plurality of well known forecasting approaches/methods (Chapter 2.4 Micro-Level Forecasting, Pages 34-47; Paragraph 1, Page 50; Paragraph 1, Page 49; Figure 1.1).

Zeni teaches the well-known application/assignment of probabilities to historical capacity demand data (e.g. EM Algorithm, Projection-Truncation Method; Paragraphs 1-2, Page 78) to reflect the stochastic/probabilistic nature of capacity demand (Last Paragraph, Page 28; Last Paragraph, 29) as well as to "fill in missing data" (i.e. censored capacity demand data) as is the case with EM Algorithm and Projection-Truncation Method.

Zeni does not expressly teach assigning a probability to the historical booking profiles or displaying an acceptance or rejection of a request for a flight as claimed.

Lee teaches assigning a probability to the historical booking profiles (curves, models, patterns, etc.; Section 4.3, Page 58; Section 4.4.2, Page 77; Last Paragraph, Page 83) and displaying an acceptance or rejection of a request for a flight (reservation systems; Paragraphs 2-3, Page 20; Figure 2.1) in an analogous art of airline revenue management (Paragraph 2, Page 11) for the purpose of maximizing profile through the generation of an accurate unconstrained (total, true) forecast of demand for each category of competing requests (Paragraph 1, Page 46; Paragraphs 1-2, Page 83).

More generally Lee teaches an airline yield (revenue) management system and method for optimizing a yield parameter resulting from assigning a capacity offered by a future instance of a flight to each one of a plurality of categories (classes, groups, levels, tiers, etc.; Paragraphs 2-3, Page 11; Last Two Paragraphs, Page 23; Paragraphs 1-, Page 34; Figure 1.1) requests, the capacity being defined by a plurality of variables (Paragraphs 2-3, Page 20; Section 2.3.3, Pages 28-29; Paragraph 2, Page 32; Last Paragraph, Page 93; Paragraph 1, Page 94; Paragraphs 2-3, Page 129; Section 6.2, Page 138; Table 2.1) comprising:

- storing a set of historical profiles (data) for each one of a plurality of previous instances of the flight including a historical value of each capacity variable reserved by each category (booking curve, profile, pattern, etc.; Section 2.37. Pages 41-42; Last

Paragraph, Page 44; Paragraph 1, Page 45; Paragraph 1, Page 46; Page 83 Figure 2.3);

- assigning a probability to each previous instance of the flight (Section 4.3, Page 58; Section 4.4.2, Page 77; Last Paragraph, Page 83);

- estimating a potential profile of a potential value of each of the plurality of capacity variables from each historical profile according to a corresponding current value of the capacity variable reserved by the category for the future instance of the flight and a unconstrained demand of the plurality of capacity variables for the category in the previous instance of the flight (Section 5.5.2, Pages 106-108; Section 5.5.3, Pages 110-112; Section 5.5.4, Pages 112-114);

- defining a historical scenario for each of the previous flight instances including a final potential capacity variable from each potential profile (Section 5.5.2, Pages 106-108; Section 5.5.3, Pages 110-112; Section 5.5.4, Pages 112-114);

- determining an authorization to allocate an offered capacity for each capacity variable of each category in the future instance of the cargo flight by applying a stochastic model to the historical scenarios according to the corresponding probabilities (Paragraphs 2-3, Page 20; Page 77; Section 4.5, Pages 82-83; Section 4.7, Page 91; Figure 2.1); and

- providing/displaying (i.e. through the denial/acceptance of reservations in the reservation system) an acceptance or rejection of a request for the cargo flight based on the authorization (Paragraphs 2-3, Page 20; Figure 2.1).

Lee further teaches that the airline revenue management system and method further comprises a generating incomplete portions (missing data) related to capacity on future flights based on historical flight information (Last Paragraph, Page 106; Last Paragraph, Page 111; Last Paragraph, Page 113); generating unconstrained demand using a censored-truncated approach/model (Last Paragraph 119; Page 120; Paragraphs 1-2, Page 123); and utilizing nested booking limits (Last Paragraph, Page 42; Section 5.6.1, Pages 119-120; Section 5.6.2, Pages 126-128; Figures 2.5, 5.1)..

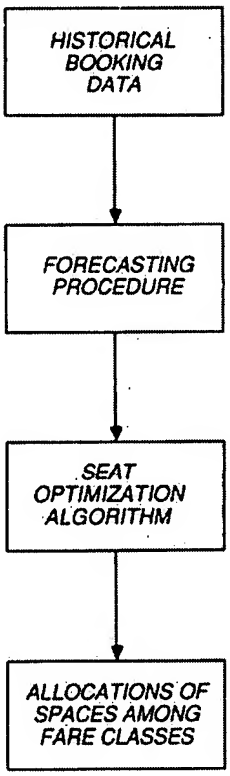

Figure 1.1 The Seat Inventory Control Process

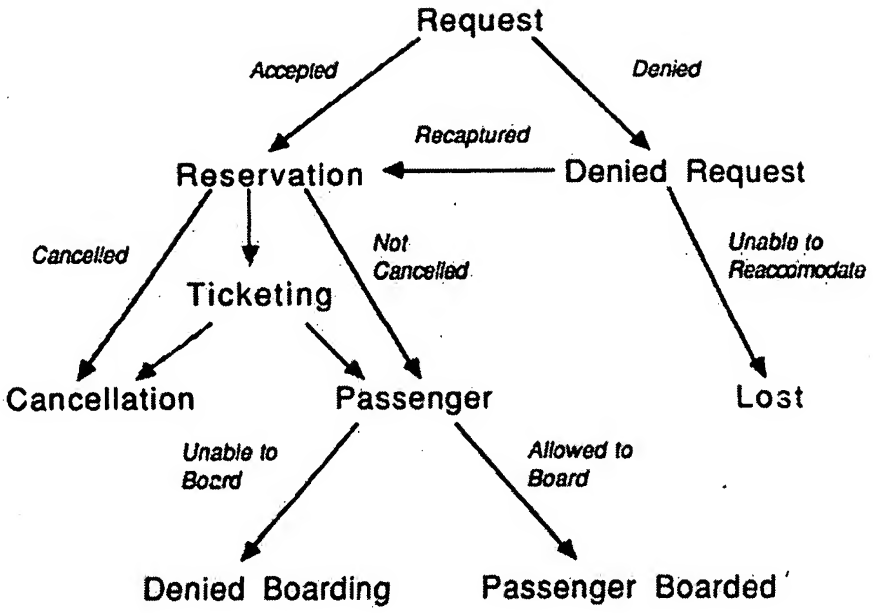

Figure 2.1 The Booking Process

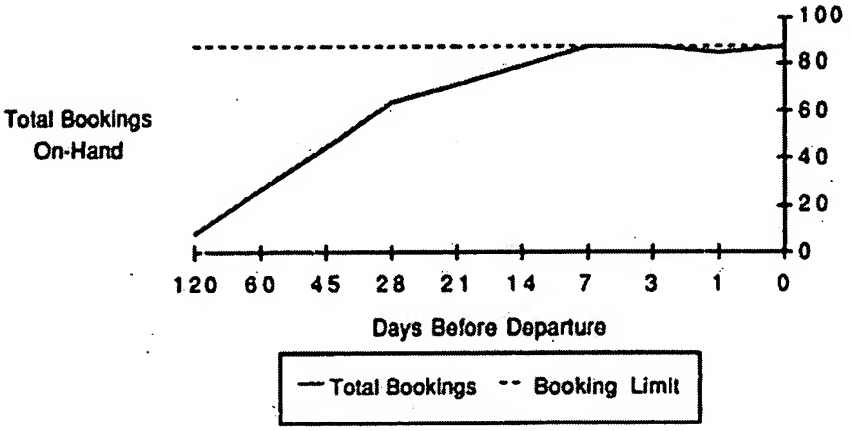

Figure 2.5 Sample Booking Curve Limited by a Booking Limit

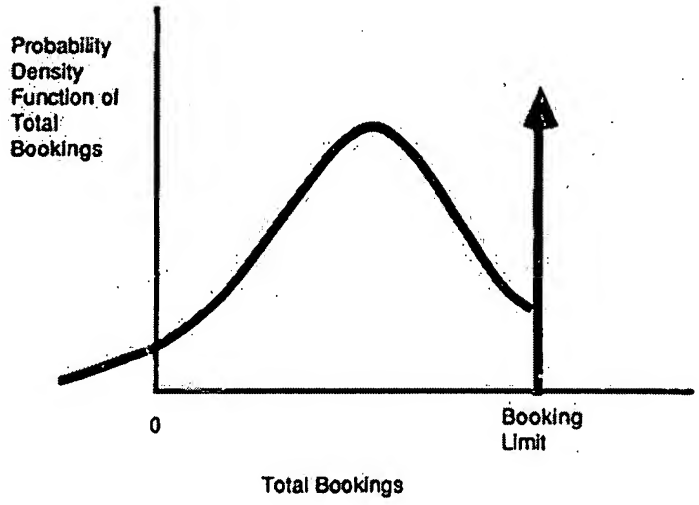

Figure 5.1 Normal Distribution Censored from above at Booking Limit

It would have been obvious to one skilled in the art at the time of the invention that the system and method for airline revenue/yield management as taught by Zeni would have benefited from assigning a probability to the historical booking profiles in view of teachings of Lee; the resultant system and method enabling airlines to maximize/optimize revenue/profit by accurately forecasting demand for the plurality of competing demand categories (i.e. forecasting the true/unconstrained demand for each category of competing requests; Lee: Paragraph 1, Page 46; Paragraphs 1-2, Page 83) as well as to account for the stochastic/probabilistic nature of such demand (Page 77; Section 4.5, Pages 82-83; Section 4.7, Page 91).

While the utilization of revenue/yield management systems and methods to optimize the allocation of air cargo capacity in order to maximize revenue and/or profile is old and very well known neither Zeni nor Lee expressly teach that the cargo includes

items other than passengers as the examiner interpreted the claim to read in light of the specification.

Günther teaches the well-known utilization/application of yield/revenue management system and methods for/to the air cargo industry (Section 2.2, Pages 11) for the purposes of "allocation capacity to different fare/demand classes so that the airline's revenue is maximized. In this thesis, both the YM problem for passengers and the YM problem for cargo are considered." (Paragraph 1, Page xiv) and the air cargo yield management problem is an extension of the air passenger yield management problem (Paragraph 2, Page 109; Section 10.2, Pages 120-122); in an analogous art of yield management for the purposes of optimizing/maximizing air cargo flight revenue (Page xiv).

Günther further teaches utilizing a plurality of capacity variables in determining which service requests (allocations) to accept or reject wherein the capacity variables include at least size and weight (Paragraph 1, Page 7; Section 2.2, Page 11).

More generally Günther teaches an air cargo revenue management system and method comprising:

- reading dates, booking period, reading intervals (Pages 3-4, 10-11; Figure 1.2);
- booking policies (Pages 10-12);
- booking limits/protection levels (Page 18);
- nested policies/booking limits (Section 3.3, Pages 13-16; Last Paragraph, Page 21; Figures 3.1-3.2);

- open/closing booking/reservations (Last Two Paragraphs, page 59; Paragraph 1, Page 60);

- accepting/rejecting customer requests (admission problem; Paragraph 2, Page 6; Page 12; Paragraph 2, Page 38; Last Paragraph, Page 109; Page 111; Paragraph 3, Page 112);

- stochastic demand models (Section 5.2.2, Page 27); and

- assigning probabilities to historical demand profiles (demand curves, demand profiles; Page 31; Example 6.1, Page 60).

It would have been obvious to one skilled in the art at the time of the invention that the airline yield management system and method for optimizing yield/revenue of an airline by assigning competing requests for capacity to a plurality of different categories of request as taught by the combination of Zeni and Lee would have benefited from being utilized to optimize the revenue for air cargo in view of the teachings of Günther; the resultant system and method optimizing/maximizing air cargo flight revenue (Günther: Page xiv).

Regarding Claim 2 Zeni teaches a plurality of well known yield (revenue) management systems and methods wherein assigning the probability further comprises:

- determining a first coefficient depending on a temporal difference between a previous (historical, past) and future instance of the service (Chapter 2.8.14 Projection

Detruncation Method, Pages 91-95; Paragraph 2, Page 91; Paragraph 2, Page 92; Step 1, Pages 93-94);

- determining a second coefficient depending on a space (time) between a current and previous service time (Chapter 2.8.14 Projection Detruncation Method, Pages 91-95; Paragraph 2, Page 91; Paragraph 2, Page 92; Step 1, Pages 93-94, Step 4, Page 95);

- calculating a weight by combining the first and second coefficients (Chapter 2.8.14 Projection Detruncation Method, Pages 91-95; Paragraph 2, Page 91Step 4, Page 95); and

- calculating the probability by normalizing the weight (Chapter 2.8.14 Projection Detruncation Method, Pages 91-95; Paragraph 2, Page 91Step 4, Page 95).

Regarding Claim 3 Zeni teaches a plurality of commonly used yield management systems and methods wherein calculating the weight further comprises calculating a weighted sum of the first and second coefficients (Chapter 2.8.14 Projection Detruncation Method, Pages 91-95; Paragraph 2, Page 91Step 4, Page 95).

Regarding Claim 4 Zeni teaches a plurality of commonly used yield management method and system wherein the historical and potential profiles (information) including a plurality of snapshots (data) of the reserved capacity variable and the potential capacity variable (Paragraph 2, Page 36; Paragraph 1, Page 57), respectively and wherein estimating the potential profiled further comprises:

- estimating an open coefficient for each period between consecutive snapshots indicative of a time during which the category was open in the period (Paragraph 2, Page 92; Open/Close Indicator Step1, Page 93-94);

- calculating an emphasis value (weight, corrective value, percentage increase, pickup, etc.) for each period as a weighted mean of a gradient in a period of reserved capacity for a category in a subset the historical profiles/information (Paragraph 1, Page 73; Tables 2.12, 2.13);

- estimating a potential gradient (curve, line, coefficient) for each period as a linear interpolation between the gradient for a first value of the opening coefficient indicative of a complete opening of the category and the highest between the gradient and the emphasis value for a second value of the opening coefficient indicative of the complete closure of the category (Paragraphs 2-4, Page 36; Pages 37-38; Chapter 2.8.8, Pages 73-77); and

- constructing a potential profile from a time corresponding to the current time by integration the potential gradients starting from the corresponding current capacity variable (Chapter 2.8.8, Pages 73-77).

While Zeni teaches well known efforts and need to model the opening and closing of capacity allocations as well as the obvious consequence of having the opening/closing of capacity categories (fare classes) between the snapshots/review points (i.e. accepting/rejection reservations; Last Paragraph, Page 80; Paragraph 1, Page 81; Last Paragraph, Page 250) Zeni does not expressly teach estimating an open

coefficient for each period between consecutive snapshots indicative of a *percentage* of time during which the category was open in the period as claimed.

Official notice is taken that approximating/estimating unknown intermediate values between two or more known values using a gradient, percentage, line and/or curve are well known in the art (interpolation, approximating missing data).

It would have been obvious to one skilled in the art at the time of the invention that the well-known methods for unconstraining censored demand data including determining if snapshots of capacity demand data contain censored and/or uncensored data based on the opening/closing of capacity categories at the snapshot review points would have benefited from estimating/approximating the amount of time between the snapshots/review points that the capacity category was open/closed using a percentage or other known interpolation technique in view of the teachings of official notice; the resultant system/method further "filling in the missing data" making the unconstrained data set more complete (Zeni: Pages 52-53).

Regarding Claim 5 Zeni teaches a plurality of common yield management systems and methods wherein estimating the potential profile further comprises (discarding negative demand/bias values; Chapter 2.8.3, Pages 63-66):

- verifying whether at least one result of the integration in each snapshot for each category is not strictly positive; and

- setting each potential capacity variable of the category snapshot to zero is the integration is not strictly positive.

Regarding Claim 6 Zeni teaches a plurality of common yield management systems and methods wherein at least one of the capacity variables includes a plurality of capacity variables and the step of estimating potential capacity variables for each category in the potential profile further comprises reconciling the potential capacity variables for each capacity variable for each category in the snapshot to a reference value of a logic relation there between (Paragraph 3, Page 35; Paragraphs 2-4, Page 36; Page 37; Paragraph 1, Page 38; Chapter 2.8.8 Multiplicative Booking Profile Method, Pages 73-77; Tables 2.12, 2.13; Figure 2.7).

Regarding Claim 7 Zeni teaches a plurality of common yield management systems and methods wherein reconciling the potential capacity values further comprises (Projection-Truncation Method, Chapter 2.8.14, Pages 91-95):

- verifying whether the logic relation between the potential capacity variables for the category snapshot is included between a first, defined by the logic expression between reserved capacity variables, and second limits defined by the logic expression between the potential capacity variables; and

- updating the potential capacity variables for the category snapshot to correct the corresponding logic relation to the closest one of the first and second limits.

Regarding Claim 8 Zeni teaches a plurality of common yield management systems and methods further comprising (Paragraph 3, Page 35; Paragraphs 2-4, Page 36; Page 37; Paragraph 1, Page 38; Chapter 2.8.8 Multiplicative Booking Profile Method, Pages 73-77; Tables 2.12, 2.13; Figure 2.7):

- determining a historical unit value of a yield parameter for each category in each previous instance of the service if available;

- estimating a historical yield parameter for each category in other previous instances of the historical unit yield parameters;

- estimating a potential unit value of a yield parameter for each category in previous instance of a flight (service) from the historical yield parameter; and

- calculating a potential value of the yield parameter for each category in each previous instance of the service multiplying the corresponding potential unit yield parameter by the potential capacity parameter, the potential yield parameter being included in the corresponding historical profile/information.

Regarding Claim 9 Zeni teaches a plurality of common yield management systems and methods wherein estimating each potential unit yield parameter further comprises (Paragraph 3, Page 35; Paragraphs 2-4, Page 36; Page 37; Paragraph 1, Page 38; Chapter 2.8.8 Multiplicative Booking Profile Method, Pages 73-77; Tables 2.12, 2.13; Figure 2.7):

- determining a current unit value of the yield parameter for the corresponding further instance of the service/flight;

- calculating each potential unit yield parameter as a sum of the corresponding historical unit yield parameter and current yield parameter weighted according to a corrective factor (percentage increase).

Regarding Claim 10 Zeni teaches a plurality of common yield management systems and methods wherein calculating the potential unit yield parameter further comprises (Projection-Truncation Method, Chapter 2.8.14, Pages 91-95):

- determining a first coefficient depending on a difference between the current time and a planned occurrence of time for the future service instance;

- determining a second coefficient depending on a increment of at least one potential capacity variable with respect to at least one capacity variable;

- calculating a correction factor by combining the first/second coefficients; and

- calculating the potential yield parameter as a sum of historical yield and current yield parameters weighted according to the corrective factor.

Regarding Claim 11 Zeni teaches a plurality of common yield management systems and methods further comprising:

- calculating a weighted mean value of the potential yield parameter for each capacity variable of each category (Steps 1-3, Page 76); and

- determining a nesting order corresponding to the weighted potential yield parameters (Chapter 1.7.3, Pages 20-21; Chapter 1.6, Pages 15-16; Paragraph 1, Bullet 3, Page 17; Table 1.2).

Regarding Claim 12 Zeni teaches a plurality of common yield management systems and methods wherein determining a nesting order further comprises providing an input nesting order of the categories for each capacity variable (Chapter 1.7.3, Pages 20-21; Chapter 1.6, Pages 15-16; Paragraph 1, Bullet 3, Page 17; Table 1.2).

Zeni does not expressly teach updating each input nesting order by ranking the categories having at least one scenario with each component that is strictly positive.

Official notice is taken the defining nesting orders/hierarchies in airline yield/revenue management systems is well known as is the need to update (revise) nesting orders (virtual nesting) wherein capacity categories capacity with positive demand should be ranked over capacity categories having negative demand.

It would have been obvious to one skilled in the art at the time of the invention that the plurality of revenue/yield management systems and methods as taught by Zeni with their ability to utilize virtual nesting orders for the various capacity categories (fare classes, product types, etc.) would have benefited from ranking the various hierarchical/nested capacity categories such that categories with positive demand are ranked higher/over categories with negative or lower demand wherein ranking from the most demanded to the least demand categories has the well understood effect of selecting/ordering the categories from the most demanded to the least demanded.

Regarding Claim 13 Zeni teaches a plurality of common yield management systems and methods wherein determining authorizations further comprises (Chapter 2/8.14, Pages 91-95):

- providing an aggressiveness parameter indicative of an attitude to the risk (Paragraphs 1-2, Page 91);

- defining a first portion of a target function for calculating the yield parameter by assigned an offered capacity with a nesting policy (Steps 1-4, Pages 93-95);

- defining a second portion of a target function by assigning an offered capacity with an out of nesting policy (Steps 1-4, Pages 93-95);

- defining the target function as a sum of the first/second portions weighted according to the aggressiveness parameter (Paragraphs 1-2, Page 91); and

- calculating the authorizations by optimizing the target function (Steps 1-4, Pages 93-95).

Regarding Claim 14 Zeni teaches a plurality of common yield management systems and methods wherein the step of defining the second portion further comprises defining an independent component of the second portion for each capacity variable (Steps 1-4, Pages 93-95).

Regarding Claim 15 Zeni teaches a plurality of common yield management systems and methods further comprising providing a user-defined scenario with a

corresponding probability and the stochastic model being further applied to the user-defined scenario according to the corresponding probability (Booking Profile Method; Paragraph 3, Page 35; Paragraphs 2-4, Page 36; Page 37; Paragraph 1, Page 38; Chapter 2.8.8 Multiplicative Booking Profile Method, Pages 73-77; Tables 2.12, 2.13; Figure 2.7).

Regarding Claim 16 Zeni teaches an airline revenue management system and method wherein the yield parameter consists of revenue, as discussed above.

Neither Zeni nor Lee expressly teach that the intended field of use of the airline revenue management systems/methods includes managing air cargo wherein the plurality of capacity variables consists of a weight and a volume as claimed.

Gunther teaches an air cargo revenue management system and method comprising weight and a volume capacity variables (Paragraph 1, Page 7; Page 120) and a yield parameter that is a revenue (Paragraph 2, Page 109; Section 10.2, Pages 120-122); in an analogous art of yield management for the purposes of optimizing/maximizing air cargo flight revenue (Page xiv).

It would have been obvious to one skilled in the art at the time of the invention that the airline yield management system and method for optimizing yield/revenue of an airline by assigning competing requests for capacity to a plurality of different categories

of request as taught by the combination of Zeni and Lee would have benefited from being utilized to optimize the revenue for air cargo in view of the teachings of Günther; the resultant system and method optimizing/maximizing air cargo flight revenue (Günther: Page xiv).

Regarding Claim 21 Zeni teaches nesting policies/booking limits and determining authorizations to accept/reject capacity requests.

Zeni does not expressly teach determining two sets of independent authorizations relating the plurality of capacity variables using a partial nesting policy as claimed.

Official notice is taken that the use of multiple levels of approval/authorization is a known and widely used concept in business wherein certain decisions require multiple levels of approval (e.g. via an approval hierarchy) depending on various business policies/rules (e.g. all capital expenditures over $500 for IT equipment need management and CIO approval; or overbooking/overselling a flight requires management approval).

It would have been obvious to one skilled in the art at the time of the invention that the airline revenue management system and method as taught by the combination of Zeni, Lee and Gunther with their ability to apply and enforce a plurality of nested

booking limits/policies would have benefited from determining authorizations for at least two of the nested policy levels in view of the teachings of official notice.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Kerr et al., U.S. Patent No. 5,404,291, teach a system and method for optimizing the allocation of capacity amongst a plurality of classes of demand/requests.

- Campbell et al., WO 97/25684, teach an airline revenue management system and method for optimizing/maximizing revenue through the allocation/assignment of capacity to a plurality of competing demand classes.

- McGill et al., Revenue Management (1999), teach the well-known utilization of yield/revenue management systems (over 40+ years) for optimizing the revenues/profits of transportation businesses through the allocation of transportation capacity to a plurality of competing demand categories (booking classes) wherein revenue management systems accept/reject capacity requests based on a plurality of booking policies and capacity variables in order to "maximize expected revenues."

McGill et al. further teaches the well known stochastic nature of transportation capacity demand and the effects booking limits/policies have on censoring demand data wherein historical booking profiles for the same or similar transportation routes (flights) are used to predict/forecast future demand.

- Hossam, Forecasting for airline revenue management (2000), teaches the importance of forecasting capacity and demand for airline revenue management systems wherein historical booking profiles (patterns) created from historical reservation data are used to forecast future demand and to drive accept/reject decisions during the booking horizon of a flight.

- Boyd, An Abstraction of Revenue Management for the Air Cargo Industry (2001), teaches an air cargo revenue management system and method wherein the system "is a mechanism to regulate demand in a system in an effort to accept demand that generates the highest returns" where "In the air cargo industry, the resources are the weight and volume capacity of a plane, and each arrival (a shipment request) has a weight and a volume that can take a continuum of values."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott L. Jarrett whose telephone number is (571) 272-7033. The examiner can normally be reached on Monday-Friday, 8:00AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hafiz Tariq can be reached on (571) 272-6729. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Scott Jarrett
Asst. Examiner
October 23, 2007

TARIQ R. HAFIZ
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3600